

## Delayed Cutaneous Findings of Hand, Foot, and Mouth Disease

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**Objective:** To describe various delayed cutaneous findings associated with hand, foot, and mouth disease (HFMD).

**Methods:** Patients presenting with clinical features of HFMD were followed-up prospectively for a period of 3 months for the occurrence of delayed cutaneous manifestations.

**Results:** Out of 68 patients on regular follow-up, 23 (33.8%) showed different types of skin and nail changes following HFMD. Nineteen showed features of onychomadesis, 9 developed nail discoloration, and Beau's line was noted in 5 patients. Cutaneous desquamation was seen in 7 patients. Spontaneous re-growth of nails occurred in all cases within 12 weeks follow-up. Skin desquamation subsided by 2-4 weeks.

**Conclusion:** Delayed cutaneous findings following HFMD are common.

**Keywords:** Beau's line, Coxsackievirus, Nail discoloration, Onychomadesis.

Hand, foot, and mouth disease (HFMD) is a self-limiting viral infection primarily affecting children under 10 years of age. Human enterovirus 71 and several strains of Coxsackievirus are causative agents. Clinical features of HFMD are characterized by erythematous papulovesicular eruptions mostly over palms, soles, knees, buttocks, elbows, and oral mucosa, and may be accompanied with pain and mild pruritus. Several outbreaks of this disease have been described from various parts of India since 2005 [1-7].

Delayed cutaneous manifestations following HFMD may be seen in the form of Beau's lines, separation of nail plate from nail matrix (onychomadesis), and desquamation. The present study describes various delayed cutaneous findings of HFMD following an outbreak in Siliguri, West Bengal, India.

### METHODS

This descriptive follow-up study was carried out at Pediatrics Outpatient Department of the North Bengal Medical College, West Bengal, India, from July 2014 to December 2014. Clearance from Institutional Ethical Committee was taken. All children (age 6 months to 15 years) presenting with clinical features of HFMD were enrolled in the study. Those with recent history of any illness like streptococcal infection, measles, and Kawasaki disease and those with intake of drugs implicated in nail matrix arrest (e.g. cloxacillin, valproic

acid, carbamazepine); or trauma to nails were excluded. Patients with atypical clinical presentation or with possibility of any other diagnoses were also excluded. Complement fixation test for a panel of antibodies against coxsackievirus A2, A4, A7, A9, A10, and A16 was performed for confirmation of diagnosis in some cases. Patients were advised to follow-up after a week and subsequently every 2 weeks for a period of 3 months. Detailed examination of the skin and nails was performed during the follow-up visits.

### RESULTS

Out of 87 patients registered during the study period, 19 were lost to follow-up. Among the rest, 23 (12 males) developed delayed cutaneous findings. Details of initial presentations are given in **Table I**. Out of 11 patients who had serological work-up, 6 showed positive results for coxsackie virus A16 antibody. Nail changes included onychomadesis (19, 82.6%), discoloration (9, 39.1%), and Beau's line (5, 21.7%) (**Fig. 1** and **Web Fig. 1**). More than one finding was observed in 12 patients. Finger nails were more commonly involved than toe nails. Number of involved nails ranged from 3 to 20 (mean 13). Onychomadesis was most commonly observed in nails of middle finger (14, 73.7%), followed by thumb (12, 63.2%) and ring finger (10, 52.6%). The interval between appearance of rashes and onset of nail changes range from 17 to 46 (mean 32) days. Nail discoloration commonly involved middle finger (7, 77.8%), ring finger (5, 55.6%) and little finger (2, 22.2%). It was diffuse in

**TABLE I** INITIAL PRESENTATION IN CHILDREN WITH HAND FOOT MOUTH DISEASE

Symptoms	No. (%)
Fever	14 (60.8)
Constitutional symptoms	07 (30.4)
Itching	09 (39.1)
Pain/burning sensation	17 (73.9)
<i>Rashes</i>	
Palm	16 (69.6)
Elbow	21 (91.3)
Other areas in upper limb	08 (34.8)
Sole	16 (69.6)
Buttock	23 (100)
Other areas in lower limb	08 (34.8)
Genitalia	03 (13.0)
Trunk	09 (39.1)
Face	07 (30.4)
Oral	15 (65.2)

nature, started proximally and slowly extended distally. In some cases, lateral nail plate was also involved. Recovery occurred by spontaneous re-growth of nails within 12 weeks, without any treatment.

Desquamation limited to periungual and palmo-planter regions was noted in 7 patients (30.4%) after 2 weeks of follow-up. This subsided gradually in next 2-4 weeks following topical application of emollients.

## DISCUSSION

Onychomadesis is a non-inflammatory condition characterized by proximal separation of nail plate from nail matrix with or without subsequent complete shedding of nails. Besides Coxsackievirus infection, it may also be seen in streptococcal infection, measles, Kawasaki disease, epidermolysis bullosa, periungual dermatitis, nail trauma, and some drugs.

In this study, nail abnormalities were evident in nearly one-third of the patients of HFMD on follow-up. We also observed nail discoloration in some patients which has not been described previously. Several reports [5,8-10] have described nail changes following HFMD since the temporal relation was first reported by Clementz, *et al.* [10]. The mechanism of nail changes still remains unexplained but it has been proposed that onychomadesis is caused by inflammation close to the nail matrix [12]. In the outbreak of HFMD in Finland in 2008, Osterback, *et al.* [13] detected Coxsackievirus A6 in shed nail fragments of a patient who had onychomadesis following



**FIG. 1** (a) Onychomadesis, Beau's line, and yellowish discoloration of finger nails; (b) Onychomadesis with loss of the right great toe nail and separation of nail plate from nail matrix and bed in the left great toe nail.

a HFMD episode. The authors suggested that Coxsackievirus A6 replication damages the nail matrix, resulting in onychomadesis [12]. Nail abnormalities have only rarely been documented from previous HFMD outbreaks in India [5].

The present study had limitations of a hospital-based study, a high loss to follow-up, and lack of etiological work-up in majority of the cases. Moreover, we could not analyze any risk factor or possible mechanism of these findings.

We conclude that delayed cutaneous findings following HFMD are common. Parents should be counseled regarding possibility of these dermatological manifestations and their benign course.

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**WHAT THIS STUDY ADDS?**

- Delayed cutaneous findings are seen in about one-third of children with of Hand, foot, and mouth disease.

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